

# AVIATION

*The Oldest American Aeronautical Magazine*

JANUARY 12, 1929

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Flight picture of the record breaking Fokker Army Transport, "Question Mark"

VOLUME  
XXVI

## Special Features

The Federal CM-3

Demagnetization Tests

Selling Aeronautics to the Public

NUMBER  
2

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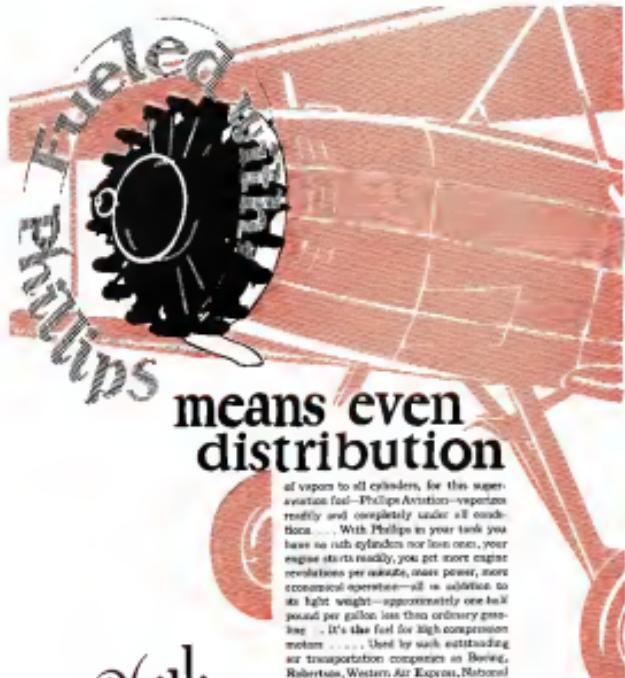
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TABLE 10. *Influence of heat treatment*

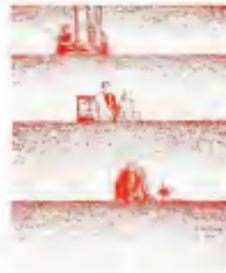


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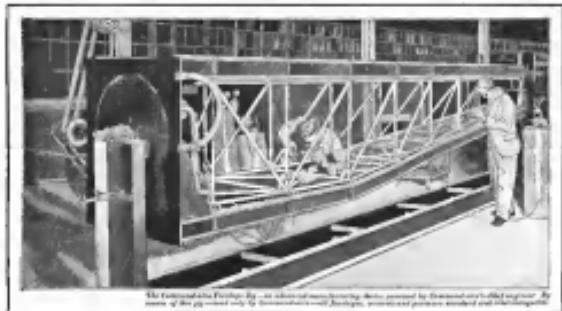
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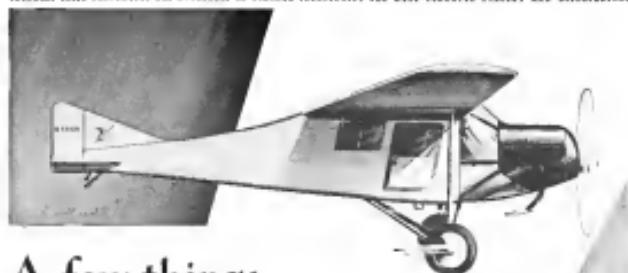
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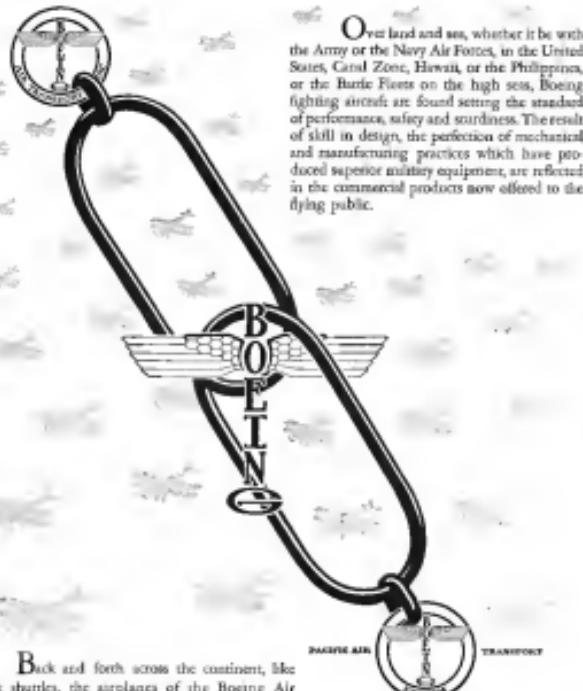
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# The Federal CM-3

*New Hallett Powered, Three Place, Cabin Monoplane Has Structure Built Entirely of Welded Steel Tubing*

By CHARLES F. McREYNOLDS

**I**NTRODUCTION of the Federal CM-3 cabin monoplane in the commercial aircraft market follows more than two years of staggering development and approximately one year of test flying. During this time the Federal Aircraft Corp., an expansion of the Ryan Mechanics Monoplane Co., has been working to perfect the application of welded steel tube structures to monoplanes, and 21 small planes adaptive to quantity production methods.

The "Lone Eagle" all steel cabin monoplane will be manufactured as the first product model. It was described in detail on page 435 of the Feb. 20, 1938 issue of *AVIATION*. A Whirlwind powered, five place cabin plane, with a full cabin fairing wing, the "Lone Eagle" has been widely known and proved thoroughly satisfactory. When in quantity production has been reached on the more advanced prewar CM-3 model it is planned to introduce a limited production schedule on the Lone Eagle for the cabin boat market.

Design of the Federal CM-3 has been chiefly directed to the adaptation of advantages of all steel construction to the manufacture of a model of popular cabin planes. The resulting model is a three place, closed cabin monoplane of exceptionally housed, high wing type. Although the first plane has been tested with the Hallett 825 seven cylinder, radial engine, which develops 130 h.p. at 1600 r.p.m., and engine up to the 225 h.p. Wright Whirlwind may be selected without structural changes and without exceeding the maximum safety factor required by the Department of Commerce.

By placing the three seats in line and providing optional dual controls to the rear seat, the CM-3 is made ideal for

advanced training. The student may be placed in either front or rear seat and still complete readily with the instructor due to the completely enclosed cabin. The rear seat seating also has advantages for night flying, flying passengers, carrying unstructured vision on either side and more room than is usual despite a maximum fuselage width of but 35 in. For serial mapping or survey work the completely protected cabin is a comparatively low cost item. The Whirlwind is the only power plant available at the present time. The design was developed by O. R. McNeil, Fred C. Apert, and Harry Blazek, with stress analysis by William J. Waterhouse.

The first plane has wing and horizontal tail surfaces

painted white, fuselage and struts black, and vertical tail

surfaces red, but it is planned to finish off standard production models with a wine brown fuselage and burnt orange wing and tail.

#### *Carries a Pay Load of 900 lb.*

The CM-3 weighs 1300 lb. empty, will carry a pay load of 300 lb., and has a gross weight load of 2040 lb. Performance figures have been determined by test flying over three months' period at the hands of O. R. McNeil and Charles H. "Duke" Bremner. Although figures are for the Hallett engine, other engines will be tested in order to furnish data for those who wish to use any standard power plant of suitable size. High speed attained was 105 m.p.h. at 1850 r.p.m., cruising speed 95 m.p.h. at 1600 r.p.m., and landing speed was 25 m.p.h. All performance figures were established with full load.

Flight safety manual for so small a plane has been completely demonstrated by long periods of hands off flying with the CM-3, and by full right and left turns or roll-over alone.

With a span of 39 ft. 6 in. and a 7 ft. chord, the Federal CM-3 wing has a low aspect ratio and excellent structural characteristics. The total supporting surface



*Front quarter view of the new Hallett powered Federal CM-3 cabin monoplane.*



*Two sections of the rearward wing of the new Federal CM-3 cabin monoplane*

is 256 sq. ft., height of the plane overall 7 ft. 10 in., and length overall 25 ft. 9 in. Although the plane is fabric covered in the usual manner, the entire internal structure, including compressor, main motor, and propeller, is built of the relatively light and strong monolithic steel tubing selected at the plant. The design was developed by O. R. McNeil, Fred C. Apert, and Harry Blazek, with stress analysis by William J. Waterhouse.

The first plane has wing and horizontal tail surfaces painted white, fuselage and struts black, and vertical tail surfaces red, but it is planned to finish off standard production models with a wine brown fuselage and burnt orange wing and tail.

#### *Wing Root as Two Panels*

Particular attention was given to economy of production by designing the wing with the result that the same root and tail of the wing spans, and front and rear spars are interchangeable. The wing is built in two panels, each being joined to the center section by four  $\frac{1}{4}$  in. arched slot bolts and externally braced in the lower longitudinal of the fuselage by two 18 gauge steel tube struts 3 in. in diameter and fitted with sheet domes. All wing fittings are white gauge sheet 1025 steel. Four compressor sections built up of 12 in. x 20 gauge chrome molybdenum steel tubing form a  $\Delta$  structure to permit easily welding into each wing panel so as to take the torque between spans.

Spars contain six members of 154 in. x 18 gauge tubing 3/8 in. to the strut fitting and 20 gauge tubing of the same diameter from strut fitting to wing tip. Between the two wing root tailings is welded in Warren truss structure with diagonal of tubing varying from 13 in. to 30 in. welded to the base panel. Diagonal tailings in all single lead panel are riveted in at front and rear of the root to No. 54 at the tip.

The wing tip decking consists of a single 36 in. x 20 gauge steel tube riveted to a streamline curve and welded to the wings. Wing ribs are of 35 in. x 24 gauge tubing welded to Fairchild truss form. The airduct section used is the Gottingen 398. The leading edge connector is manufactured by 3-ply, 1/16 in. Hinsleff top and bottom plates riveted to the front spar. Trailing edge of all wings is formed of 12 gauge sheet 1025 slightly flattened and welded to rib tips. Ailerons of Fairchild type are constructed of welded steel tubing and mounted on outriggers from the rear spar by three pin hinges. All ribbing in the wing and throughout the plane is treated with Linseed oil and sealed, while the exterior is protected by one coat of oil varnish primer and one coat of glass lacquer. Covering is of Federal Grade A fabric thoroughly doped with Berry Bremner's product.

The fuselage is built in two sections, the rear section being of three-quarter cabin and the fore part of the fuselage. No cross housing characterizes the cabin. The entire fuselage is assembled and welded on a master jig into the monolithic Warren truss structure and uses no wire bearing. Padding is accomplished by dual channel members clamped to

the tubing. Grade A Flightite fabric doped with Berry Bremner's product is used as covering. The front and rear sections are joined with two large doses on each side of the cabin. Of clear fabric construction and equipped with nickel plated solder type handles, they provide an unobstructed opening which makes the cabin as easy to enter as is the ordinary closed car. Cabin doors are of wicker covered steel framework, with teapestry covered cushion, each containing 36 individual coil springs and padded with felt. The floor is of corrugated charcoal, while the walls and ceiling are finished in a high grade fabric. Large side and rear storage compartments may be easily opened for ventilation. A large baggage compartment in rear of the main cabin is reached through a door on the right side.

A folding front seat makes it easy for the pilot to reach the cockpit through the forward cabin door. An emergency exit is provided by hinged overhead windows. Although the pilot is seated directly in the cabin, the instrument panel is so narrow and the magnetos so low that instruments are suspended by a wire from the top of the fuselage in order for the pilot to see the ground over the engine at a distance of 50 ft., and the landing gear is always in view. Triple safety glass is used in the sliding panels of the V type windshield, while the large windows of plate glass on either side of the pilot may be completely raised or lowered. Consolidated Type A instrument panel is used, flying instruments being mounted on right, with engine instruments, switches, throttle, and auxiliary adjustment on the left. Altimeter, barometer, oil speed indicator, oil pressure gauge, oil temperature indicator, and navigation lights are standard equipment.

#### *Optional Dual Control Panel*

All control surfaces are operated by wire cables running over Niagara pulleys. The main stick is used for ailerons and elevator control, but the rudder is operated by rocking pedals hinged at the heel. Optional dual controls of stick and rudder bar type are fitted to the rear seat position on the cabin. Strobe aurasights lights are standard and Strobe landing lights are optional equipment, the two lights each being controlled by a switch.

A distance gauge against engine is planned to use any standard engine of suitable size. A heavy aluminum fence will be built into the forward end of the rear engine cowling. A distance gauge of one of the N. A. C. A. designs for radial engines has been fitted and will exhibit a scale of 0 to 1000 ft. and will take into account the curvature of the fuselage while permitting the maximum of visibility over the top of the engine.

Two 25 gal. of tanks are carried in the engine mount with provision for the expansion of 1 gal. A single 80 gal. tank is carried in the rear section above the rear cabin provides gravity feed to the engine. A visible gasoline gauge is installed in the cabin ceiling.

All mainframe members are of welded steel tubing, each being mounted on three pin hinges. The rudder, of balanced type, is

also mounted on three pin hinges. Stream line wire is used here to fit and strengthen the fastener. The stabilizer is of split type adjustable at the forward end by means of a worm gear operated by a torque rod from the pilot's seat.

Brakes are standard equipment as the apt side landing gear, which has a travel of 9 ft. 6 in. Strut-mounted wheels are fitted with 30 x 5 in. tires. Tires are sprung shock-struts extend vertically to a frame as the forward wing strut, from which point the vertical spars are carried to the upper landing struts, while the lower landing struts are carried by a strut to the lower longitudinal, thus forming the seat between the struts as shown at the cabin door.

The old sled is a new development, a typical arrangement in which the sled itself is non-springable and non-creeping, being diagonally braced downward to each lower longitudinal while a third member, extending up to the tail post, cushions the landing by means of alternate soft and hard rubber disks under compression. The sled has proved most valuable when maneuvering on the ground in cross winds or tail winds.

#### Factory Has Floor Space of 35,000 Sq. Ft.

The present Federal factory at San Bernardino, Calif., with a floor space of 15,000 sq. ft., has a capacity of 10 planes per month. However, a new factory site has been obtained and it is thought that a complete new factory will be completed within four months, with a capacity of the rate of a plane a day. In the meantime it is said that the Federal CM-3 is being built at the old site at approximately one plane per week.

Line production as laid out in the new factory will take advantage of the welded tube construction to speed up fabrication of the planes. Factory organization will be consolidated into three departments: construction department, in which cutting, fitting and welding of the tubing will be done; finishing department, in which cov-



Side view of the new Federal CM-3.

ing, doping and painting will be concentrated, and final assembly department. Entire elimination of the wood-working department is expected to speed up production rates.

All steel tubing will be cut to size and stored in bins as it is received at the factory. From these bins it is drawn by workmen who in the taking into steel jigs especially designed for quick assembly of members, carry welding, and rapid removal of the finished part. By the time the entire unit after it has been welded and before removal from the jig, all stresses caused by the welding are eliminated and the part will remain permanently in permanent alignment and be interchangeable with all other parts in the same jig.

It is not to this end may be built as much faster with processes which have been developed in the welding department of the Federal factory, that even allowing for higher labor cost of welders over girls used in the fab-

rication of wood ribs, and higher cost of the chrome molybdenum steel taking into the completed job cost less than if they were built of wood. After ribs, spars, and compression members have been built up they are placed in a master wing jig platform and permanently welded into a single unit. Factory gas welding equipment is used throughout all welding operations.

Officers of the Federal Aircraft Corporation are Frank Solt, president; G. K. McNeil, vice president; Fred C. Ayers, secretary; W. G. Harris, treasurer, and Grant Helcom, legal H. Mack, Henry Howell, director.

National distribution rights are owned by the firm of Bowens & McNeely, Los Angeles, who will market the plane under the factory, distributor, dealer plan and with



Front-three-quarter view of the new Federal CM-3.

the trade mark "Wings of Steel." Bowens & McNeely are also Southern California distributors of Stoco fog lights and all State products.

Charles R. "Dick" Bowens is well known as a veteran Pacific Ave. Transport pilot, and has a record of 3500 hr. to his credit. Charles F. McGow is a former Chicago business man who now holds a private pilot's license.

Specifications of Federal CM-3 monoplane as supplied to AVIATION by the manufacturer are as follows:

Length overall	25 ft. 9 in.
Height overall	7 ft. 10 1/2 in.
Airfoil	Gorringe 308
Span	39 ft. 6 in.
Chord	7 ft.
Wing area	285 sq. ft.
Swingblade	0 deg.
Diagonal	0.496
Incidence	1.50 deg.
Winglet	1500 lb.
Propeller	3200 rpm.
Disposable load	2400 lb.
Gravitational load	1600 lb.
Power plant	Halsted 350, 130 hp at 1800 rpm.
Power loading	9.5 lb. per sq. ft.
Power loading	28.6 lb. per hp.
High speed	95 mph at 1800 rpm.
Crusing speed	85 mph at 1600 rpm.
Landings speed	32 mph.
Take off in still air	750 ft. per min.
Climb at one level	12,000 ft.
Absolute ceiling	13,000 ft.
Gasoline capacity	40 gal.
Range at cruising speed	400 mi.
Endurance at cruising speed	4.5 hr.
Cost of plane at factory	\$5,000

# A 1929 Air Tour?

*Some Informative Remarks Regarding the Rule, the Complaints, and the Situation as it Now Stands*

By JOHN T. NEVELL

**C**ONSIDERABLE speculation is being indulged in by those of the aircraft industry as to whether there will be another National Air Tour.

Contesting that the annual reliability contests for commercial aircraft "has served its purpose, and hence is no longer needed" has been spread about the country. Rumor of dissatisfaction on the part of some of the pilots participating in the 1928 event have been extremely ample to warrant that these pilots no longer would consider competing for the Edsel B. Ford trophy. Dozens of other pilots refuse to back the just and the famous of the National Air Tour have headed in various airship circles of the nation.

Some of these "slogans" have been of perfect "house-pose" quality, and have remained to be developed into supposed established lines. Others have been bandied about the air from whence they came, only to be "green the gas" and taken to fields more profitable.

Will there be another National Air Tour for the Edsel Ford trophy? Edsel B. Ford, vice-president and secretary of the Detroit Board of Commerce, sponsor of the Tour, was asked, "Does your good-bye?"

"Certainly, we intend to stage another Tour—if the industry wants one," he replied.

"Do you believe that the industry wants another one?" he was asked.

"We believe it so strongly that we are laying a foundation for the next one," Mr. Campbell answered.

Despite the somewhat uncharitable charge leveled against the organization by several of the disgruntled pilots who took part in the 1928 reliability contest, the Board has no substantial interests in the industry's motor car position.

These interests leave that the Detroit Board of Commerce, in going to the expense and trouble of staging a tour of this kind, is sincerely trying to promote aviation as an industry. There is only one reason why an organization such as ours should run its tour, aircraft shows, and other such events, and that is, that we want to make friends with the industry. If the industry, as represented by the nation's leading aircraft manufacturers, National Air Tour there will be places entered. If the manufacturers do not enter their planes, there will be no Tour."

*Yes or No?*

Thus, the question is put squarely up to the manufacturers. Do they see in the continuation of the National Air Tour an opportunity to increase the objective toward which the Tour is aimed? Do they see in its numerous further enlargement of the liaison concerning things aeronautical? Do they see it is safer and more plausibly operated aircraft? Do they see it more cognizant knowledge of what the other fellow is doing? In short, do they see in an annual cross-country competitive flight involving many representative American compe-

ting airplanes, MORE SALES, hence a decided benefit to the industry itself?

With four successfully conducted commercial air tours, each of indisputable benefit to the industry, as a background, the Detroit Board of Commerce has encouraged its members to stage a fifth one.

John P. Wood, winner of the 1928 Tour, publicly stated, following the Tour, that "there is a need for one more National Air Tour."

"On the last Tour, we found the public with a far greater knowledge of aeronautics than ever before," he said. "The knowledge increased us, also, were far more popular."

Although Mr. Wood's views may not be shared by all the pilots who were in the first Tour, we feel certain they are shared by a large majority of them. And certainly it seemed, also, that all of the pilots were not heartily in accord with the spirit of the pilots' petition filed with the Board following the Tour. This petition, discussed in AVIATION in a previous article, was signed by 1000 aviators, and was presented to the Board with the request to, set the last.

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*A New Spot Created*

Regardless of how it was intended, this paragraph was repeated by those behind the Tour as sufficient evidence that the pilots questioned their integrity. It left a raw spot that was not in the least avenged by any of the remaining paragraphs.

And these were among the paragraphs that followed:

"We prefer to eliminate the carrying of passengers in the contest, in excess of the machine and passenger, who would be suitable in the promotion of aviation."

"We desire the employment of a suitable publicity man, well qualified to handle publicity for the entire Tour."

"We find the Tour is able to stand on its own legs, and it is our desire to see it incorporated as a separate institution, managed and operated by competent flying personnel, and at the same time, by men with executive ability. We suggest the formation of a 'National Air Tour Association' to stage the Tour annually."

Undoubtedly the last stage is the most important. While the absurdity of such a proposal of establishing such an organization will not be discussed here, it can easily be seen that such a move would entail complete reorganization of the Tour management.

The Detroit Board of Commerce, time and again, has stated that it is not averse to having the Tour management taken out of its hands. The Board has assumed



not longer than 90 days in the county jail or both. Also, the burden rests with a defendant to prove he is not amenable to prosecution.

Section 8 concerns public safety as general and is of particular import and general sufficient interest to be quoted in whole:

"The public safety requiring and the advantages of uniform regulation making it desirable in the interest of aeronautical progress, it is hereby declared, the purpose of



*A view of the Glendale Municipal Airport, Glendale, Calif.*

this act to make uniform as nearly as possible the laws respecting airmen, aircraft operators, and air navigation facilities throughout the United States and to furtherance of this purpose it is declared against the policy of this state to permit local legislation respecting, or regulation of aircraft, aircraft operators, or air navigation facilities, and all such legislation or regulation in this state by any county, city, town, or other political subdivision, and all aeronautical legislation and regulation on the subject of aircraft operation, or the operation of air navigation facilities, or the location of air airmen is hereby declared to be null and void of all effect, and so to reconstitute the state hereby except the field of such legislation.

For the benefit of those who would disagree with any of its parts, the section which designates this as "The California Air Navigation Act of 1939," is as follows:

"The committee's experience in attempting to determine what the state needs is the way of air facilities and of coordinating various efforts will be of benefit to other states. We have considered development and improvement of landing fields to be of paramount importance. The efforts of the committee may be classified under five general headings. This may serve as a guide to other states:

- 1—Development and Improvement of landing fields.
- 2—Development of landing fields and aeronautical air ports.
- 3—Assist in the establishment of adequate emergency landing fields, in the forests.
- 4—Conduct a campaign providing for uniform standards of all airports, using as a basis the Department of Commerce landing rules and regulations.
- 5—Landing Field Directory.

- 6—Publish a book giving accurate data on all first class landing fields in the state.

- 7—Formation of State Aviation Laws.

- 8—Conduct the work of the Special Aeronautical Legislative Committee in formulating sound laws and assist in having these laws enacted.

- 9—Development of aviation manufacturing and Related Enterprises.

- 10—Assist in the development and maintenance of an

adequate weather reporting service in California, including the broadcasting of same.

- 11—Conduct a campaign throughout California urging that the state be a safe town and city for piloting on a dependable basis which it is desired to be known from the air.

- 12—Assist the operating lines, both mail and passenger, with air mail and air passenger campaigns.

#### 3—Public Education and Information Service.

- 13—Assist in the establishment of an adequate system of aeronautical education in the high schools and colleges of California.

- 14—Conduct another Aeronautical Conference and carry on the proposed program in the state.

- 15—Conduct educational campaigns through newspaper and through furnishing of public speakers.

In proceeding with encouragement of landing field facilities, we realize that every community wants an airport run by the Department of Commerce for the protection of such federal investigation wings with it. Many California towns to date have planned two-way fields, with as provision for cross-landing. The Department of Commerce has recommended a 1,200 ft. long, 100 ft. wide, runway and all directions with clear approaches, or a two-way field with runways 1,200 ft. long and 200 ft. wide, converging at an angle of not less than 60 deg.

No community should plan an air strip less than class size or 50 ft. wide, or 100 acres, or 100 ft. wide, in all directions the 14 ft. field is best, out for landing strips, these should be 2,000 ft. long, 100 ft. wide, and converge at an angle of not less than 90 deg. In no case, we have noted, can anyone plan on two or three air strips. They may well need more at this time, but a minimum of 100 acres with cross runways to take care of all wind directions are needed.



*An aerial view of flying field and race track of Del Monte, Calif. This is one of California's emergency fields.*

Also, each park should be easily accessible from its nearest population center, or otherwise have a nearby port of entry, so that the park which adds fuel and materials such as telephone and automobile to its service will favor with pilots and air passengers. These things add to the general safety and convenience of air travel. Generally speaking, these the Department's regulations are based on considerations of safety, these items should be followed. It is a green city has not yet acquired an airport, it should exert every effort to do so. All land generally is increasing in value. The costs of moving from one place to another will increase steadily. Also, property values will tend to disappear in proportion to the increase. This is particularly true of the larger cities. It is difficult to measure how many airports in California are logically

located. This is a local problem, although state and federal officials will assist communities everywhere to locate airports. Too frequently, however, I am told, convenience is disregarded.

In California there are now 108 fields aside from those declared as emergency. Of these 75 are public ports and fields, 27 private and 6 government. For civil purposes, the government fields are termed emergency or auxiliary fields. At this time our committee is engaged in studying locations for auxiliary fields. The own auxiliary or intermediate airports and looks better than "emergency." It can be used for emergency, too, but it is a complete assistance. The Department of Commerce is interested in locating fields every 30 mi. along national airways. The department expects organizations within given states to work toward establishment of fields approximately midway between the 30 mi. fields. This will give an average with fields every 15 mi., which should aid materially in building up public confidence in air travel.

#### Support State Map for Passengers

Landing field directories have been published in some states. The only difficulty is to have an accurate map that the cities, towns, and roads as clearly as possible can be plotted. We have as a result a substitute map, a state map for passengers, rating fields and other points of interest. Such a map will serve not only to inform pilots of landmarks and fields, but aid passengers in enjoying their trips more fully.

Naturally, commercial developers will go to those places whose fields are most accessible to the demands of commercial aviation. In California 100 ft. wide, 100 ft. long, 100 ft. wide, and 100 ft. long, 100 ft. wide, are the only type airplane operators. Some of these places carry 15 passengers each. Such large airplanes cannot land on inadequate fields. Aside from the purely physical aspects of aviation, however, considerable thought should be given to legislative problems. The Department of Commerce studied the various phases of aviation a long while before recommending its rules and regulations. Its opinion has become expert in the legislation.

On January 1, 1939, the Air Commerce Act of 1938 going into effect according to the Department of Commerce came as the continuation of 14 yrs. of argument for federal regulation of civil aviation. Several bills were introduced in Congress in previous years but failed in passage. Meanwhile several states had passed laws and the rapid growth of post-war surmounts led directly to the Aviation Act Association and other organizations and individuals in the training of a bill which resulted in the present act.

#### Air Regulations Simplified

The problem of the regulation of commercial aviation in the United States is somewhat involved, due to the rights of the individual states and the specific powers of legislation contained in the federal constitution. The Air Commerce Act empowered the Department of Commerce to make regulations pertaining to the qualifications of pilots and planes and certain other air traffic control as applied to air. The individual states and cities do not have power to regulate aircraft used exclusively within the limits of the state for local purposes, except as to air traffic rules. The tendency is, however, for the legislatures of the several states to enact laws which will conform to the philosophy of regulation as promulgated by the Department of Commerce. (These are available from the Department.)

By following in general the Department of Commerce recommendations, a given state will find benefit in step

with her sister states and moving toward popularization of aviation. Once landing fields have been prepared and marked, few communities need step calls for development of aviation transportation, this to be followed by a campaign of public information.

One of the most important enterprises in California is the weather reporting service, provided by the Weather Bureau and the Guggenheim Foundation. This furnishes several news daily and is available to all transportation companies and pilots who have use for it. The service reports weather conditions in various altitudes between 20,000 ft. and 40,000 ft. Above 40,000 ft. the weather does not meet us; but unless people generally are brought to the realization that



*The U. S. Navy Air Service base, North Island, San Diego, Calif.*

it is at once safe and economical. A terrible field for dissemination of information in the schools. Aviation has not been developed overnight. In 30 yr. or so, present students will be pilots and users of aircraft. Air education in schools and colleges will take an important and rightful place. William John Cooper, superintendent of public instruction in California, now has two committees working on proposed aviation courses for public schools. In California there are three high schools are giving courses in aviation.

As a result of the work of the statewide aviation committee, it is ordered that California might have a state air law all the laws in the United States bearing on the general subject were digested and concluded based on a study of these laws were adopted 30 of all conceivable tests. Now that the air has been approved by some of the most important organizations in the state, it will be used to various chambers of commerce, chapters of the A. A. A. and other groups interested. We believe aviation and its techniques are of and for the people, and unless they give a full measure of interest and support, such laws as this die unheeded.

Chambers of commerce in every state can be of great service toward promoting not only their local aviation interests but also those of their state, for without unity in the nation we can not have the maximum possible national commercial effort. The various members of the California Development Association is a liaison house for aviation and as a leader and participant in various activities. Some communities seek our advice with reference to locating and equipping airports. A similar valuable service could be given by any state chamber of commerce. It is this type of service that stamps a chamber of commerce as progressive and contributes to general progress.

# Demagnetization Tests

## A Discussion of the N.A.T. Experiments to Determine the Cause of Magnetic Loss Resulting from Booster Operation

By A. H. PACKER

**A** MONG the myriad service problems which have arisen in keeping planes in condition at the hangars of the National Air Transport in Chicago, one that does not lend itself to an easy solution, although not really serious, has caused considerable speculation and concern. It is the partial demagnetization of one magnet while the other retains its magnetism. And the one that loses its magnetism is always the one with the booster magnet.

Taking the evidence at its face value and assuming that the booster magnet was responsible, it was equally evident that it was not near enough to cause any trouble with its own magnets. The primary current of the booster had no chance to interfere with the circuits of the regular magnets. And that left but one possibility. It must be the secondary current.

### Secondary Current Tests Conducted

Secondary current, however, with its very low amperage could not have a magnetizing or demagnetizing effect worth considering—with one possible exception. If there was any way for this secondary current to leak back through the secondary coil of the regular magnet, then the combination of low amperage with a high current, but at much higher voltage, might have an appreciable effect. On this assumption a number of experiments were conducted.

The regular magnet was of the inductor type as shown in Fig. 1 and Fig. 2. The booster magnet was one that gave four sparks per revolution, but was geared up so fast it gave a shower of sparks while the engine was being started. With the distributor segments rotated to 45°, the primary plug connection to the distributor block would be broken when the high tension segment would be in between spark plug electrodes and therefore causing to lead showers of sparks through the shorting electrical path to ground. The problem was now to see if by any chance there were times when the path of the short resistance was by way of the secondary winding of the magnet.

This resolved itself into a question of by what chance the sparks could get from the booster distributor segment to the distributor coil to the regular segment which is connected to the coil secondary.

The indicated path is shown in Fig. 2 by arrows. The arrow marked "S" is the what was in the coil of evidence and represents a path which must be completed by a jumping spark or series of sparks, if the reason for the demagnetization is what it was intended to be. It was found, however, that the booster magnet was easily provided with a safety gap in the regular magnets, as shown in Fig. 1, for the sparks, with distributor blocks

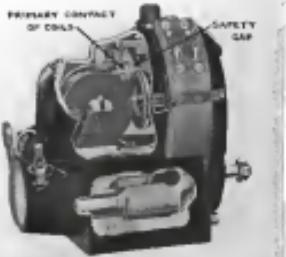


Fig. 1. Photomicrograph of inductor type magnet showing safety gap utilized by the booster magnet.

removed, would jump to the primary contact rather than pass over the surface of the distributor rotor, from one segment to another.

When this hypothesis was then considered, the nature of which will be indicated by referring to the left detail of Fig. 2. Here we see that distributor booster current to 45° is connected to the distributor block, which would be broken when the high tension segment would be in between spark plug electrodes and therefore causing to lead showers of sparks through the shorting electrical path to ground. The problem was now to see if by any chance there were times when the path of the short resistance was by way of the secondary winding of the magnet.

### Two Different Paths Possible

With the parts in the relative position shown in this diagram it will be seen that if short circuit sparks from "S" to "C" for the distance "A" then, however, they have two options. One is to transmit the spark plug circuit and jump a spark plug which is under compression. The other is to jump across to "B" which is very near "C". "B" at this instant is practically a ground connection, except for the resistance of the secondary winding. The assumption was therefore made that in many instances it would be possible for sparks to return through the secondary of the regular magnet coil.

In proving this assumption as well as it could be proved

with the apparatus available, the distributor blocks were removed and in place of the contact "C," the tip of a screw driver blade of the same width was used. This was held at various positions between "A" and the "B" and was found to allow the transmission of sparks from "S" to "B" when the booster magnet was energized, the sparks would immediately from "A" to "B" by means of the intermediate metal of the screw driver blade. And they did this in preference to jumping to the tip of the safety gap.

### Safety Gap Closed to 3/16 In.

The next step in the experiment was to close up the safety gap of Fig. 1 from 5 in. to 3/16 in. This was done to see if the safety gap would still allow the short circuiting sparks to occur, but there was still another test to make.

This was to try the operation of the system with spark plug under 80 lb compression or more to see if the safety gap was too small for reliable operation.

These tests showed that the proposed correction by means of a smaller safety gap was not one to be immedi-

ately put into operation, at least without further testing and experimentation, for it was found that at just about 80 lb compression the sparks would start to eat out at the plug under compression and begin to fire at the safety gap, which cut off the current to the primary coil, so reducing, as would naturally, the magnetism.

The experiments here related are given to show the various circumstances under which demagnetization can occur as a result of booster operation. But the complete elimination of this demagnetizing action may depend on enlarging distributor construction which permits having greater distances between the segments that distributes booster current and the one that is connected to the regular magnet.

Another point was not previously made to the fact that the leakage current from the booster would be first magnetizing and then demagnetizing. With the magnets heavily magnetized, however, it is easier to make them lose magnetism than it is to make them stronger. The reversals would seemingly be detrimental rather than neutral or helpful.

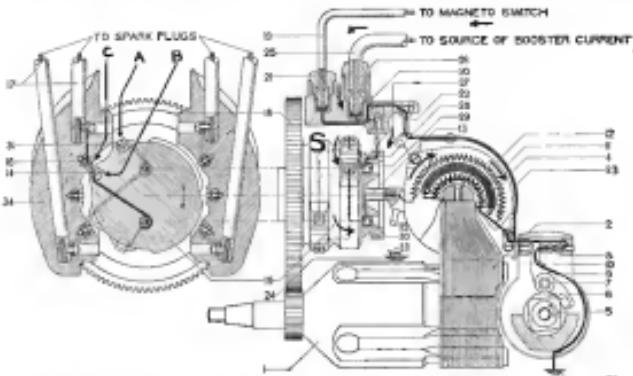


Fig. 2. A diagram of electric and magnetic circuits. Arrows show the probable path of leakage booster current which tends to cause demagnetization.

1. Starting magnet
2. Flywheel end coil
3. Primary winding
4. Booster coil
5. Flywheel
6. Distributor block
7. Distributor rotor
8. Long contact point (Dashed)
9. Main spring for breaker lever
10. Short contact point
11. Breaker lever
12. Secondary winding
13. Spark return series break
14. Flywheel end cylinder carrying secondary current
15. Distributor cylinder
16. Flywheel in distributor block
17. Flywheel cable
18. Large distributor arm
19. Flywheel and ground connection block
20. Flywheel arm for ground wire
21. Flywheel arm for primary wire
22. Flywheel ground contact
23. Flywheel arm for booster current
24. Ground through the magnet and engine
25. Booster cable
26. Flywheel arm for booster wire
27. Flywheel arm for booster current
28. Flywheel arm for booster current
29. Flywheel arm for collector ring (in booster circuit)
30. Flywheel arm for collector ring (in secondary circuit)
31. Flywheel arm for cylinder carrying booster current
32. Safety gap diode
33. Ground plate for safety gap
34. Distributor block







## Personnel

THOMAS E. PAUL, for the past 12 years supervisor of the Naval Aircraft Factory at Philadelphia, has been promoted to the rank of director of production by the Sikorsky Aircraft Co. of Alexandria, Va., according to announcement by Wallace H. Moore, Jr., president.

J. H. BURTON, formerly a research engineer and test pilot for American Eagle Aircraft Corp. of Kansas City, has resigned his position there to join a brother in Fort Pierce, Fla., where the two will represent the American Eagle company and start a new service and flying school.

JAMES V. BLANTON, aeronautical engineer, has been offered a staff of officers by H. E. du Puy de Nemours & Co. to assist Col. Paul E. Bostwick, vice president of Transoceanic Air Transport Corp., in the construction and operation of establishing a combined rail and air passenger route from New York to Los Angeles and San Francisco. He will supervise the installation of hangars, repair, aeronautical stations, and survey lighting equipment.

DR. W. F. GOWAN, first graduate of the University of Michigan aeronautical engineering class in 1919, representative of the American Engineering Co., has been invited to Detroit from Dayton, Ohio, to take charge of the Curtis Flying School branch to be opened on Grand Tr. Dr. Gowen and C. V. Stroh, manager of the Curtis Flying School, have agreed to form the newly-organized Michigan Flying. Operations are to begin about February 1.

EDWARD F. MANN has resigned his position as manager for Pauli's Aerocraft Inc. to become the chief engineer for the Southern Aircraft Co., arriving in an announcement made by officials of the Canadian firm, which manufactures a new type of aircraft. He will be in charge of the work of Mr. Hinchliffe's interest in the light plane field and his belief that a ready market exists for the type of aircraft, the announcement says.

WILLIAM H. CONYERS, formerly of the American Mechanics School of Great Lakes Training Station, is now associated with the Embry-Riddle Flying School at Cincinnati. Mr. Conyers is taking charge of the ground school course.

CARL R. ANDERSON of Minneapolis W. Va., former Ohio State University basketball player, has joined with Edward J. Conroy, Mr. Conroy's partner, in the Midwest, will assist in the traffic department during the winter.

JOSEPH WERNER is now operations manager of Universal Air Lines System, Inc., Cincinnati, Ohio, with Robert Evans his assistant and third pilot. Texaco Service has been added to

## Arranging Tour In New England

BOSTON, MASS.—Plans are progressing for a New England tour of the United States which is to start next month at Boston. The purpose of the tour is to open the summer flying season at the principal flying centers and the same will be under the direction of Frank H. Hayes, manager, New Bedford, Western, B. L. New London, New Haven, Bridgeport, New Haven, Hartford, New Haven, Waterford, Portland, North Adams, Springfield, Northampton, Chicopee, Worcester, Marlboro, Agawam, Pittsfield, Ludlow, Lowell, and Boston. The tour dates are not yet fixed, but it is expected to start about the early part of June 21st.

pitcher at Woburn Aerodrome Field, managing Thomas Lee, acquired Mr. Hayes likes the flying school. A. M. Rose is assistant traffic manager for New England and R. H. Mayman for St. Paul.

MURRAY BARBER, for the past few years manager of representative of the American Telephone & Telephone Co., has been appointed to the president of the American & Motor Corp., of Lincoln, Sth.

LAWRENCE D. HARRISON has been appointed manager of Woburn Aerodrome Field for New England's airport. Mr. Harrison was a war pilot and manager of an airport at Germany for the Army at the conclusion of hostilities.

## General Aeromatic To Build Sesquiplane

SAN FRANCISCO, CALIF.—Construction of a three-plane tour campion will be begun by General Aeromatic Service here, it is announced by Philip Hale, sales engineer for the concern. Design of the new plane is practically complete and the first plane, to be built in the fall, will be a sesquiplane.

The plane will have conventional wood and wire wings and will be used for long-distance flights. The projected tour plane is one of the new types Wright engineers.

The concern also will build later a tour-plane flight for use in student work. This will have full cantilever wings and will be powered with one of the new air-cooled motors of about 100 hp.

**Push Pen Order by Plane**

LOUISVILLE, KY.—Loaded with a complement of 100 passengers and 100 mail and express items for the Pan Am. Jan. 12, 1929, Mr. "Brother" Doolittle, a Florida pilot, recently arrived at Louisville Field, the principal airport of Santa Fe. The purpose of the unique flight that he has been making is to promote the use of the automobile to hold the entry record of the last minute by Charles E. Lindbergh, who came 3,000 hr. to his credit, it is pointed out.

## Trade Tips

It Has Been Expected That—  
Expenditure of \$50,000 for the development of a new hangar for the Detroit City Council is to be made in the near future, exclusive arrangements having been made with the airport committee of the City Council of Detroit, Mich.

The Kinner Aircraft & Motor Corp. has taken a lease on the former place of the Detroit Steel Drift Co. on the Franklin Road and Colgate Street, Glendale Cabin, and will remodel and add necessary installations of an assembly line in planned.

Immediate continuation of a hangar and repair shop is planned by the Stinson Flying Service, Memphis, Tenn.

Transoceanic Air Transport, Inc., is now taking bids on construction of runway and hangar. By the 21st of this month, bids will be received, and the structure will be located at Kinston, N.C., one at Myrtle Beach and one at Myrtle Woods.

The city of Lincoln, Neb., of which Randolph H. Scott is city clerk, is having a new airport built at a cost of \$100,000 to be completed by spring, at the airport which has four and one-half miles north of Lincoln.

EDWARD B. REED, Wisconsin state legislator, has recommended that the legislature be asked to appropriate money for an air way of the state. Mr. Reed is said to have told the com. board of public affairs that it is no good sign of Wisconsin in existence.

The E. L. Yerkes Corp. from the Chicago district, in the new Department of Commerce, request for Wichita License (1928) statement here, will interest Transoak at Clinton, C. A. BRAEMER, manager of the Wichita office, has been assigned to the Denver office, and Herman E. Taylor has gone to operate for the Kansas-Missouri-Colorado area with headquarters in Kansas City. Ernest W. Loomer manager at Wichita, has resigned to enter Army service.

## Large Order to Consolidated

NEW YORK, N. Y.—Order for 200 complete airplane instruments has been placed by Consolidated Internationa Company of America from the Austria Eagle Aircraft Co. Russia City, with value of \$10,000 to be filled in 10 days.

## AIRPORTS AND AIRLINES

### Plan Largest Hangar For Detroit's Airport

DETROIT, MICH.—Major John C. Lodge and the Detroit City Council recently formally approved a contract with Louis Komper, Detroit architect, for the construction of a new airport, with a large hangar and other buildings to be constructed on the city's new recommended airport at French and Lynd Road.

The hangar, which is to cost \$100,000, will be 300 ft. long and 100 ft. wide, and situated on an L-shape on one corner of the airport. Each arm of the building is to be 100 ft. in length.

At the present time, the structure has not been completed, and city engineers already are at work determining levels and foundation locations. It is hoped that the building will be completed by April 1, at which time the airport will be opened at that date. All American Airlines, Inc., is to be started here April 6 to 14.

In that connection the architect showed the Council a letter from Mr. Ernest one, who represents the American Airlines, Inc., which stated he would pay \$100 for the full value of the structure, guaranteeing its completion within 90 days.

### Robertson Line Opening

OMAHA, NEB.—Regular air mail and express service to the new Constitution-Cov.-St. Louis line, Robertson line will start about January 15 according to H. J. McMillin of Chicago, general manager of the Universal Air Lines. The new line will be the 10th to be opened by the Robertson company, who also began a flight schedule between Omaha and St. Louis, connecting with Boeing planes which arrive in Omaha shortly after midnight. The passengers will be carried on the night route.

### Appleton Appropriates for Field

APPLETON, WIS.—An appropriation of \$50,000 has been made by the city council for the loan of an airport to serve mostly the small planes, which now fly to Menasha on the Fox River valley air-mail schedule. The site contemplated for the new airport is in the center of the present part of the North American Aviation company. It is currently leased for the three years.

### Open Harrison Field

SAN JUANITO, CALIF.—Harrison Field, this city, has now been officially opened for aviation. The new field is located one-half mile south of San Joaquin at the Hocket Valley. It is an excellent condition.

### Open P. A. A. Mail Service From Miami to Porto Rico

#### Company Also Inaugurating Route to Panama Canal Zone Through Central America

MIAMI, FLA.—With Pan American Airways, the Pan American, assisting in the ceremony, the first air mail service to link the two Americas was officially inaugurated, as we go to press January 9 with the first plane leaving here for San Juan, Porto Rico.

This inaug. Pan American Fokker plane, was to take off at 9:15 A.M. Wednesday, arrive at Havana, Cuba, at 11:20 A.M., stop over night at Eastern Cuba, and then continue its flight to Porto Rico the following morning, with a stop at Santo Domingo at 4:30 A.M. and arrive at San Juan at 6:30 A.M. Pan American will leave each Monday, Wednesday and Friday, with frequency to service required to a daily schedule, as soon as practicable.

THE concern with Pan American Airways, the Pan American, will be the first to open a mail route to the Canal Zone, the first to link the two Americas through Central America. The mail will be handled centrally by Pan American, who will pay \$100 for the full value of the structure, guaranteeing its completion within 90 days.

#### Southbound to Canal

TO THE south after the inauguration of the Miami-San Juan route, Pan American Airways will be the first to open a mail route to the Canal Zone, the first to link the two Americas through Central America. The mail will be handled centrally by Pan American, who will pay \$100 for the full value of the structure, guaranteeing its completion within 90 days.

#### Plan Improvements for Mills

SAN FRANCISCO, CALIF.—A new east and west runway, 300 ft. wide and 3,000 ft. long, and some 300,000 ft. of drainage work are to be done for the new airport to be built for Mills Field, the San Francisco municipal airport. The drainage consists of a series of six impounds, spaced 80 ft. apart, paralleling existing runway. The new runway will be built with a mixture of shale rock and gravel.

#### New Road for Oakland

OAKLAND, CALIF.—A new short-cut road is under construction from this city to the Oakland Airport and will be ready next summer, according to George M. Ross, city engineer. The highway is to cost \$50,000.

#### Name Two Ports of Entry

WASHINGTON, D. C.—Announcement is made by the Treasury Department that two new airports of entry will be established in the District of Columbia, one at the Anacostia River, the other at Lake Union, near Seattle, Wash., and Rainier Field, San Diego, Calif. The early destination for both will be the D. C. Mayor's field in the Seattle district.



# FOREIGN ACTIVITIES

## German Tickets Simple in Form

*Passenger of Air Transporter Is Similar to Railway Paddington*

BERLIN, GERMANY.—No striking difference between the sale of a ticket for German air transportation, on the Deutsche Luft Hansa, for instance, and the sale of a railroad ticket in the United States is apparent to the passenger. The ticket which shows the passenger name and the total number in the plane.

The Deutsche Luft Hansa tickets are divided into three parts, each one bearing the name of the passenger, the date of travel, a number, a copy of the other two, and at least by the ticket holder. The two coupons which are given to the passenger for telephone, telegraph, telephone, post, tele, radio, and other services, must be given to the other agents, and service to a Deutsche Luft Hansa, Deutsche Post, etc. The first coupon, which is taken up at the starting point, has a block printed on it which reads "Ticket valid for the route and may be exchanged upon arrival at destination, has a blank space for signature as to arrival. The conditions of transport are printed on the back."

A simple and simple summary of these conditions is found in the "General Transport Conditions for Passengers Air Services" which is obtainable at urban agencies and airport offices open to the public.

Passenger tickets and baggage may also be obtained at these offices. Passengers are forbidden to enter or leave a plane with given permission. You are then allowed to pass the others themselves.

### Rome Loop Covers 1,375 Mi.

ROMA, ITALY.—The Roma-Maremma-Ravenna-Genoa air service which was recently put into operation has a total length of 2,225 kilometers (about 1,375 miles), a report received from the Italian Foreign Office said. Passengers take off in Monday mornings from Genoa and return.

### French Flies in Association

PARIS, FRANCE.—National Federation of Agents of France is the name of the new organization of independent French firms which have joined by the members of three groups, Aéro-Bruxelles (Bruxelles Weyl), Union of Commercial Pilots, and the Association of Professional Pilots.

### Enters Two Fields in Egypt

### English Aero Firm Mergers Announced

LONDON, ENGLAND.—Announcements of two new ventures of increasing interest have been made lately.

Victrola (Avondale), Ltd., is reported to have acquired the former assets of Supermarine Works, Ltd., the aircraft manufacturer, holder of which held a number of important records, prominent among which is that gained in the victory of the Supermarine, "Sopwith 2 1/2" at the Schneider cup race, Verviers, last September.

The Supermarine "Sopwith 2 1/2" was the Schneider cup in 1930, and planes by this company were used in the first four races of the Schneider cup competition by the Royal Air Force. A. Royd, well known English pilot, was one of the heads of the Supermarine company, becomes a Victoria director.

The other merger is that of the A. V. Roe Co. of Manchester with the Siddeley-Deasyson group.

### Reese Well Equipped

ROMA, ITALY.—The "Littoria" airport here is one of the most completely equipped in the world, according to Count Leon Donadieu. The project promised by Count Giacomo Boncompagni, general manager of the Italian Aeroplane and Motor Vehicles (Ostacolli Aeroplani), Co., a high cost and operates the head landing field, includes a total of 265 acres. The location of this airport permits landing for up to 100 aircraft. The construction of the Italian Government is reported to have exceeded the sum of 1,000,000 lire (\$165,000), the Municipality of Roma a similar amount, and the balance of the total cost of 20,000,000 lire (\$3,200,000) was furnished by the local company.

### Life Will Have Art

PARIS, FRANCE.—Fights for an aperitif at the bar, one of the most important editorial cities of this country and one of the most popularly used during the war, have been supplied.

### New Beardmore Metal Plane



Lotus of the British Army, built with all metal. *Beardmore Iron* powered *Beardmore Universal*. Some auxiliary in design to the single "Jupiter" may be noted.

# THE BUYER'S LOG BOOK

### Novalux No. 3 Floodlight

AN AIRPORT floodlight, in which circular lenses and reflectors are entirely eliminated, has been developed by the General Electric Co. and is now included in its line of aeronautical products. The Novalux No. 3 projector contains 14 high power incandescent lamps providing a total of approximately 5,000,000 cp. These lamps are arranged in a row in front of an cylindrical array of lenses which spread the light over the field in such a way that it does not fall high enough to interfere with the waves of prior landing aircraft onto the field. The beam of light is 300 ft. horizontally and 3 deg. vertically and projection is made to adjust the reflectors.

Operating elongated 1,000 watt, 32 volt incandescent lamps, subular in shape and gas filled, are used producing a total load of 20 kw. Tungsten filament, reflectors black and highly coated to concentrate the light source as employed. Reflectors are prefocused, so being essential that the light source is at the top of the mirror to obtain a narrow parallel beam. The mirrors, which are 36 in. high and 15 in. wide, are of special optical glass, or earthy ground, polished on the curved direction and



A photograph of the Novalux No. 3 Airport Floodlight manufactured by the General Electric Co. plane, in the horizontal. This accounts for the wide horizontal and vertical beam divergence. The side reflecting surface on the back of each mirror is highly contoured.

In the case of the floodlight housing there are six support springs to prevent vibration of the universe to floodlight under conditions. The lamps are provided with lenses to prevent direct light from escaping upward at the front, and similar to larger lenses attached to the sides prevent direct light from reaching upward in those directions.

The incandescent lamps and reflectors are mounted on a rigid welded pipe structure, independent of and extending through the housing. This structure is secured to the side of the housing so that the heat does not affect the light beam. The housing is of light weight construction, 8 ft. high, 15 ft. wide and 4 ft. deep and is very light and dust tight. It is so designed that conversion can easily carry the heat from the incandescent lamps to the housing, where it is rapidly dissipated. While not intended as a portable device, the floodlight is mounted at

the middle on removable wheels to facilitate movement. The front of the unit consists of three rectangular panels, each containing three strips of plane, heat-resistant glass. The middle panel is parallel to the line of longitude, the other two are at angles so as to distribute illumination of the beam in the horizontal direction.

Among the advantages claimed for this new design are uniform distribution of light and higher intensity of illumination per kilowatt input.

### Phister Fire Extinguishers

PIESTER MAINTAINED air pressure for extinguishing agents are made in 1, 3 and 10 gal. capacities and each extinguisher is supplied with its own pump because pumping is necessary. Simply turn the valve and direct the stream as you would a hose line. These products are made by the Phister Manufacturing Co., 301-303 Broadway, Cincinnati, O.

Phister Fire Extinguishers are constructed entirely of stainless steel. The tank is a heavy brass casting, to which are securely fastened an inner and outer brass shell forming two chambers. The outer chamber contains extinguishing liquid and the inner chamber contains air under pressure, which is released into the outer chamber. Since the liquid is a carbon dioxide stream sent out through the hose a distance of 35 to 40 ft.

A high efficiency pump extends through the top until just above the top and is severely stressed on the bottom. The pump is used to operate the air pressure after the extinguisher has been used. In addition to the pump, the extinguisher is also equipped with a regular automatic fire valve, which makes it possible to release the gas from the tank. The gas from the tank is forced out through the nozzle and is entirely removed from the liquid.

The Phister No. 1 is a portable Carbon Tetrachloride extinguisher of 1 gal. capacity. It can easily be handled and operated by one person. The weight fully charged is 315 lb., and the shipping weight is 60 lb. The Phister No. 3 is identical in construction and operation to the No. 1 except that its capacity is 3 gal. of Carbon Tetrachloride. The Phister No. 10 is a two-cylinder hand pump. The Phister No. 10 has a capacity of 30 lb. of Carbon Tetrachloride and is mounted on wheels. Carbon tetrachloride is selected in construction and operation to both the No. 1 and No. 3. This model weighs 455 lb. fully charged. The shipping weight is 60 lb.



Technical construction of fire extinguisher

## Orange Steel Hangars

THREE GENERAL types of airplane hangars are now being offered by the Orange Car and Steel Co., Orange, Tex. Each of these types embodies several new ideas in the covering of a hangar roof at minimum cost. The company also offers various structural plans with each hangar and is also prepared to provide for foundation work and complete erection when the method is desired.

Orange hangars are built on frames made up of steel angles and shapes and roof trusses are shop riveted in sections of convenient size for transportation. All connections made on the roof are bolted, thus hangars can be removed from one location to another without loss of time. Orange's patent bearing struts, which gauge galvanized copper bearing corrugated sheets are used for roofing and siding, these sheets being fastened directly to steel girders and purlins without the use of woods or nailings.

Standard factory type and steel with ventilating sections are used as windows. Clear or factory riveted steel may be used, glued with chips and sand and pottery.

Start down on the use of the vertical link type of steel for structural framework and extended on the heavy type. These cause less overhang and, in certain locations, often considerably shorten the hangars. They are of maximum strength and require no additional ground space. They are supported by hard chocks and can be opened or closed in one and one-half seconds.

The Type II Orange hangar is designed for large airports and is available with door openings ranging from 36 x 10 ft., 6 x 10 to 8 x 18 ft. and on lengths from 50 to 60 ft. Larger lengths in multiples of 20 ft. also can be provided. This larger hangar is built on hard soil and would not be required to be founded with doors at both ends when desired. A 12 x 8 ft. sliding door is also optional for one or both ends.

The type A hangar is a "T" shaped building extended for overhead storage and can be provided in 40 ft. sections by the addition of units in the original structure. The live spans range from 36 ft. to 80 ft. span over open airage. The Type M, which is provided with openings in the same range of sizes, is a more modern model made on the same principle as the Type II. It is built on hard soil and lengths of 40 and 60 ft. are provided in the five ranges of sizes of the Type M hangar but any greater length in multiples of 20 ft. also can be furnished. A 12 x 8 ft. sliding door is also optional for one or both ends.

## Adapt-o Chair

INCLUDED in the products of the Adapt-o Chair Co., 413-417 East 36th St., New York City, is a self-adjusting reclining seat designed especially for strippers engaged in transport service. The Adapt-o chair is simple in design and has no springs nor complicated mechanisms to get out of order. It is available in aluminum or leather covers.

The Adapt-o chair can be furnished with an adjustable stool and a cushion to harmonize with city colors interior. The back is pressed in the fluorocaric and the seat is hinged to the back. The pivot point is so located that a slight increase in pressure on the back will cause the seat to move forward slightly and the weight of the occupant prevents the back from going too far.

An unknown number of positions is now possible by the design of this chair, the exact position being thus of close location. The device is so balanced that it will remain very firmly in position. These chairs are made to meet the demands of any airplane manufacturer.

## SIDE SLIPS

By ROBERT R. OSBURN

Mr R. S. P. of Concord, N. H., sends in an interesting clipping from the Boston Post describing an incident in an airplane "of the old Jenny Land type." Apparently the reporter has solved a few houses in Jennes and is trying to find the man who put the plane in the ground. We are compelled to write what he has disclosed. The amateur Aviator was quite pleased when he read this item as he had always been searching for a fastly plane for his Jenny. He immediately went out to the field and with appropriate search and endeavor obtained it the "Spirit of the Swedish Nightingale."

\* \* \*

Mr. C. H. C., of Cambridge, Mass., writes to us, we do not know exactly what is on his Jenny. These cases are often overlooked, in our opinion, after other similar cases like the hangars. They are of maximum strength and require no additional ground space. They are supported by hard chocks and can be opened or closed in one and one-half seconds.

"No, there is nothing when one is hanging along, as what is the never gives the impression of wild speed, that is really unpleasant. For one thing the engine holds a much more even rhythm. The hangar cover softer and newer is the quick narrowing of the air pockets, and the center of gravity lie due in the dry from a position as is usually distributed that the atmosphere is much the same.

We agree with Professor C. that the business of evenly distributing each center of gravity might be a quite unpleasant situation even at high speed.

\* \* \*

Of all the bizarre "aviator" stories which have flared the newspaper and magazine lately, we think the proudest of all is the one which the we sent in by W. V. of the Kite, Pa. It is, as follows:

"The seriousness of his crash was heightened by a come track. Before Dick took off on his long flight, he had strapped a pass on broad which he had battered well and after wringing in wood paper had placed in his pocket. Becoming fatigued after several hours of circling air flying, he unstrapped his pass and just as he raised it to his mouth however, a terrible blast of air rose it from his hand and it flew directly into the propeller, where it stuck fast. Dick regarded it giddily and with chagrin. Finally an idea flashed upon him. He would cut jet. Lowering his safety belt, the daring aviator prepared to climb out on the wing for his meal. Carefully setting the stability so the plane would not dive, he made a left turn to counterbalance his weight while on the right wing. Then, leaping abruptly out of the cockpit he snatched the nose too close broad and bounded back to his seat. And nose was seat! The plane was badly out of balance, the circling air current caused it to dip and rise. Not long after this, Dick found an account of the position of the cockpit, the ship was prepared to fly into the dissolved jet open. Like lightning, Dick's paniced hand seized the controls. He threw the stick forward to stall the spin while his frenzied foot sought the rudder. Madly he kicked it back and forth until he rolled the plane back to an even level. Then with a sigh of relief he snatched back to enjoy his hard earned lunch."

## When the World's Crack Trains are too Slow!



Northwest Airways, Incorporated, in connection with three of the great western railroads, have selected Pratt & Whitney powered equipment to carry on the first air-mail route.

By the use of Ford tri-motors and Hamilton single-engine planes, now in daily operation between Chicago and St. Paul and Minneapolis, a full business day is saved the traveler on his trip to the East or West Coast.

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THIS new revolving beacon was built by the Crouse-Hinds Company to meet the requirements of the United States Department of Commerce and is the government standard for use on airways.

The barrel, base and transmission arms are of cast aluminum silicon alloy.

Search lights which use the spill light of the lamp enable an operator to locate the beacon after he has passed out of range of the main beam.

A rugged and dependable lamp changer is also provided.

Before purchasing a beacon, be sure to see this latest government standard.

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## A New 180-degree Airport Floodlight



THIS new airport floodlight is the last word in landing field illumination. It is entirely new in principle and design.

Designed for the distributed system of field lighting, it gives perfect illumination without glare, and provides absolute reliability.

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Below

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1929—Today the Vought Corsair is the official plane of practically every ranking officer in the U. S. Naval Air Service.



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There are so many in this other college that you might school in January! The fact 115,000 men of the Parks plant are now in the field is not in the air. But men are needed—badly—so production cannot go on!

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You have factory production methods learned qualified for field duty. Factory jobs demand high pay.

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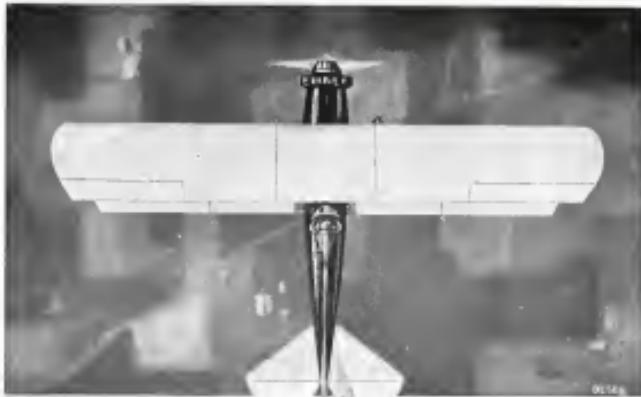
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